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KNOBBE MARTENS OLSON & BEAR LLP
2040 MAIN STREET
FOURTEENTH FLOOR
IRVINE, CA 92614

EXAMINER	
VAN ROY, TOD THOMAS	
ART UNIT	**PAPER NUMBER**
2828	

DATE MAILED: 11/13/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/676,543	Applicant(s) PARK ET AL.	
	Examiner Tod T. Van Roy	Art Unit 2828	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 October 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-18,21-27 and 34-40* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-18, 21-27, and 34-40* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

The examiner acknowledges the cancellation of claims 28-33.

Allowable Subject Matter

The indicated allowability of claims 1-18, 21-27, and 34-40 is withdrawn in view of the newly discovered reference(s) to Wagener. Rejections based on the newly cited reference(s) follow.

Due to the discovery of the new references, the finality of the previous office action is hereby withdrawn. Subsequently this office action will be made non-final.

In summary, Wysocki and Wagener are combined to teach the EDF length optimization, and the Fidric reference is used in an obviousness rejection to the calculation method claims.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.

4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-3, 6-9, 12-13, 16, 34-36, and 39-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wysocki et al. (US 5177562) in view of Wagener et al. (US 5875203).

With respect to claims 1 and 7, Wysocki teaches an active and low power laser stabilization comprising of a superfluorscent fiber source (SFS) (1110) having a first end (112), second end (114), a fiber length (col.11 lines 45-50), an optical coupler (1118), and a pump source (1130) producing pump light (col.21 lines 30-65). Wysocki further teaches that the mean wavelength is a function of temperature and power of the pump source and that the forward amplified spontaneous emission (ASE) propagates away from the pump source (col.11 line 50 – col.12 line 32), the ends of the fiber are polished to provide a reflector surface to reflect backward ASE and forward ASE (col.12 lines 18-39), an optical isolator (1120) coupled to the 2nd end of the EDF, and additionally "The pump power and the pump wavelength of the pump source are selected so as to minimize the sum of the intrinsic temperature dependence of the active medium, the pump power dependence of the mean wavelength and the pump wavelength dependence of the mean wavelength (col.4 lines 37-40). Wysocki additionally teaches optimizing the length of the EDF to reduce the contribution of the forward ASE light to the output light (col.12 lines 40-62). Wysocki does not teach optimizing the EDF length to reduce the dependence of the mean wavelength on the pump light power. Wagener teaches a SFS wherein it is taught that optimizing the length of the EDF can reduce dependence of the mean wavelength on the pump light power (col.8 lines 32-37). It

would have been obvious to one of ordinary skill in the art at the time of the invention to combine the SFS length optimization of Wysocki with the SFS length optimization of Wagener in order to more easily adjust the system to a selected stable operating point.

With respect to claim 2, Wysocki further teaches that selecting the pump power and the pump wavelength of the pump source is a way to minimize the total variation of the mean wavelength with respect to temperature of the fiber (col.5 lines 25-28).

With respect to claim 3, Wysocki teaches a method where he uses a differential equation to minimize the total variation of the mean wavelength with respect to temperature of the fiber. This equation will be referred to as the governing equation (col. 10, lines 24-28).

With respect to claim 8, Wysocki teaches everything claimed as applied above, in addition temperature variations of the erbium-doped fiber are reduced (col. 14, line 65 to col. 15, line 24)

With respect to claim 9, Wysocki teaches a variation in the mean wavelength due to temperature variations are estimated (col. 15, lines 1-10).

With respect to claim 12, Wysocki teaches that the optical fiber has a small signal absorption (col. 11, lines 27-28). Additionally, Wysocki states that an exact absorption value is dependent on the wavelength.

Claim 13 is rejected for the same reasons outlined in the rejection to claim 1 above.

With respect to claim 16, Wysocki fails to teach the polarization dependent loss, the structure of the reference is substantially identical to that of the claims, claimed properties or functions are presumed to be inherent (MPEP 2112.01).

With respect to claim 34, Wysocki teaches an active and low power laser stabilization comprising of a superfluorscent fiber source having a first end (112), second end (114), a fiber length (col. 8, line 34), an optical coupler (1524), and a pump source (1130) producing pump light ((col. 12, lines 6-7) propagating to the erbium fiber via the coupler (col. 24, lines 33-34). Wysocki further teaches that the mean wavelength is a function of temperature and power of the pump source and that the forward amplified spontaneous emission light propagates away from the pump source of toward the pump source (col. 11, line 50 to col. 12, line 32). In regards to the mirror, the ends of the fiber are polished to provide a reflective surface to reflect backward amplified spontaneous emission and forward amplified spontaneous emission (col. 12, lines 28-39). The pump power and the pump wavelength of the pump source are selected so as to minimize the sum of the intrinsic temperature dependence of the active medium, the pump power dependence of the mean wavelength and the pump wavelength dependence of the mean wavelength" (col. 4, lines 37-40). Wysocki additionally teaches optimizing the length of the EDF to reduce the contribution of the forward ASE light to the output light (col.12 lines 40-62). Wysocki does not teach optimizing the EDF length to reduce the dependence of the mean wavelength on the pump light power. Wagener teaches a SFS wherein it is taught that optimizing the length of the EDF can reduce dependence of the mean wavelength on the pump light power (col.8 lines 32-37). It

would have been obvious to one of ordinary skill in the art at the time of the invention to combine the SFS length optimization of Wysocki with the SFS length optimization of Wagener in order to more easily adjust the system to a selected stable operating point.

With respect to claims 35 and 36, Wysocki teaches that the mean wavelength is selected by reducing and accounting for variations in the temperature of the erbium-doped fiber (col. 5, lines 25-28).

With respect to claims 6 and 39, Wysocki and Wagener teach the SFS outlined in the rejection to claim 1, and Wysocki further teaches the dependence of the mean wavelength on the pump wavelength is small or substantially zero (abs., taught to be minimized).

Claim 40 is rejected for the same reasons as claim 1 above.

Claims 17-18, 21-23, and 25-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fidric et al. (5,313,480).

With respect to claim 17 Fidric teaches a method to an estimated mean wavelength of a superfluorscent fiber source, where the method comprises: providing an SFS having an actual mean wavelength, the SFS comprising an erbium doped fiber (50) having a temperature and a pump source (12) (col. 3, line 42); configuring and obtaining the SFS such that the wavelength has a dependence on the temperature of the EDF (col. 8, lines 41-53), measuring the temperature of the EDF (col. 9, lines 10-12). Fidric does not teach calculating the estimated wavelength using the measured temperature of the EDF and the dependence of the wavelength on the temperature of

the EDF. It would have been obvious to one of ordinary skill in the art at the time of the invention to use the calculated temperature vs. wavelength relationship of Fidric, to calculate a mean wavelength for a given temperature as one of ordinary skill in the art would recognize this as being the purpose of determining the relationship in and of itself (obvious to use the formula after having solved for it).

With respect to claim 18, Fidric teaches a pump source (12) with temperature and a drive input current (col. 6, line 44). The step of configuring the SFS comprises: controlling the temperature of the pump source (col. 8, line 34), and controlling the input current of the pump source (col. 7, line 35-38). While reducing the polarization dependent losses is not specifically disclose, the structure of the reference is substantially identical to that of the claims, claimed properties or functions are presumed to be inherent (MPEP 2112.01).

With respect to claim 21, Fidric teaches the method outlined in the rejection to claim 17, including the use of derivatives (col.8 lines 53-63), but does not teach calculating a best fit straight line. It would have been obvious to one of ordinary skill in the art at the time of the invention to determine the relationship using a best-fit line as this would lead to a slope value of the two parameters, namely a derivative of the set of points, and similar to that function already preformed by Fidric.

With respect to claim 22, Fidric teaches everything claimed, as applied above, in addition, the SFS has a double pass configuration (col. 4, line 10).

With respect to claim 23, Fidric teaches that a variation in the mean wavelength is a function of the temperature of the fiber (col. 8, lines 39-41).

With respect to claims 25 and 26, Fidric teaches measuring the temperature of the EDF comprises measuring an ambient temperature and measuring that the temperature of the EDF is approximately equivalent to the measured ambient temperature and obtaining the dependence of the actual mean wavelength on the temperature of the EDF comprises measuring the dependence of the actual mean wavelength on the temperature of the EDF (col. 9, lines 5-20).

With respect to claim 27, Fidric teaches the method outlined in the rejection to claim 17 above, and further teaches obtaining the dependence of the mean wavelength of the temperature of the EDF from another source (the pump source).

Claim 5 is rejected under 35 U.S.C 103(a) as being unpatentable over Wysocki et al. (5,177,562) in view of Fidric et al. (5,313,480).

With respect to claim 5, Wysocki discloses an active and low-power laser stabilization comprising of a superfluorscent fiber source with the exception to specifically indicate how to reduce the influence of the pump light wavelength on the stability of the mean wavelength comprises reducing variations of the temperature of the pump source. However, reducing the influence of the pump light wavelength on the stability of the mean wavelength comprises reducing variations of the temperature of the pump source is well taught by Fidric (col. 8, lines 40-53). It would have been obvious to one of ordinary skill in the art at the time the invention was made to reduce the influence of the pump light wavelength on the stability of the mean wavelength comprises

reducing variations of the temperature of the pump source to stabilize the laser diode temperature.

Claims 10-11, 28-32, and 37-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wysocki et al. (5,177,562) in view of Ang et al. (6,144,788) and further in view of Wagener et al. (5,875,203).

With respect to claims 10-11, 28, 29, and 37-38, Wysocki teaches an active and low-power laser stabilization comprising of a superfluorescent fiber source. Wysocki teaches everything except to specifically indicate the stability wavelength value during a specific period of time. However, Ang discloses, "the wavelength stability is 2 ppm. Grating (40) at the output of pump (28) improves wavelength stability over time by ten times" (col. 6, lines 21-23). Figure 12 (Ang) shows the wavelength value remains constant for a period of 78 hours. In other words, time is not a factor. Ang failed to discloses an approximant +-0.5 ppm. However, Wagener teaches that sources show an improvement in mean wavelength stability by an order of magnitude or more over present sources. Base on those two references, It would have been obvious to one of ordinary skill in the art at the time the invention was made to realize that one can achieve an approximate 0.5 ppm over a period of time of at least one hour or 17 hours to improve deviation.

With respect to claim 30, in conjunction with the rejection above, using Wysocki, Ang, and Wagener as references, in addition Wysocki further disclosed a SFS with a double pass configuration (Wysocki, col. 12, lines 7-10).

With respect to claim 31, in conjunction with the rejection above, using Wysocki, Ang, and Wagener as references, in addition Wysocki further discloses a SFS comprising an erbium- doped fiber sources having temperature (Wysocki, col. 8, line 11).

With respect to claim 32, in conjunction with the rejection above, using Wysocki, Ang, and Wagener as references, in addition Wysocki further discloses the "governing equation", which is to minimize the total variation of the mean wavelength with respect to temperature of the fiber. (Wysocki, col. 10, lines 24-27).

Claims 14 is rejected under 35 U.S.C 103(a) as being unpatentable over Wysocki et al. (5,177,562) in view of Falquier et al. (6,429,965)

With respect to claim 14, Wysocki teaches an active and low-power laser stabilization comprising of a superfluorescent fiber source with the exception of coupler comprises of a wavelength division multiplexer. However a coupler comprises of a wavelength division multiplexer is well know in the art as taught by Falquier (col. 8, line 29). Base on those two references, It would have been obvious to one of ordinary skill in the art at the time the invention was made to include a WDM coupler for the purpose of transmitting together, and separating again the optical signals with different wavelengths.

Claim 15 is rejected under 35 U.S.C 103(a) as being unpatentable over by Wysocki et al. (5,177,562) in view of Falquier et al. (6,429,965) and further in view of Tsukitani et al. (6,404,950).

With respect to claim 15, Wysocki and Falquier disclose everything claimed as applied above, in addition a WDM coupler is provided (see claim 14). Wysocki and Falquier are different from the claimed invention in that the PDL is not disclosed. However, Tsukitani stated that the WDM coupler (52) preferably has a polarization-dependent loss of 0.2 dB or less (col.13, lines 39-40). Base on those two references, It would have been obvious to one of ordinary skill in the art at the time the invention was made to ensure that the PDL was less than 0.01 decibel to have less noise in the signal.

Claim 33 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wysocki et al. (5,177,562) in view of Ang et al. (6,144,788) in view of Wagener et al. (5,875,203) and further in view of Falquier et al. (6,429,965).

With respect to claim 33, in conjunction with the rejection above, using Wysocki, Ang, Wagener, and Falquier as references, in addition Wysocki further discloses that the thermal can be shift in any temperature with the exception of disclosing a specific range of temperature for the fiber. However, the temperature of the fiber can be control to approximately +-0.5 degree Celsius is well known in the art as taught by Falquier (col. 14, lines 3-4). Based on those references, It would have been obvious to one of ordinary skill in the art at the time the invention was made to control

the temperature of the EDF to be stable within a range to provide a predetermined stability of the SFS mean wavelength.

Claims 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fidric et al. (5,313,480) in view of Ang et al. (6,144,788) and further in view of Wagener et al. (5,875,203).

With respect to claims 19 and 20, Fidric teaches a stabilization apparatus and method for an SFS. Fidric discloses everything except to specifically indicate the stability wavelength value during a specific period of time. However, Ang discloses, "the wavelength stability is 2 ppm. Grating (40) at the output of pump (28) improves wavelength stability over time by ten times" (col. 6, lines 21-23). Figure 12 shows the wavelength value remains constant for a period of 78 hours. In other word, time is not a factor. Ang failed to discloses an approximant +-0.5 ppm. However, Wagener teaches that sources show an improvement in mean wavelength stability by an order of magnitude or more over present sources. Based on those three references, It would have been obvious to one of ordinary skill in the art at the time the invention was made to realize that one can achieve an approximant 0.5 ppm over a period of time of at least one hour or 17 hours to improve deviation.

Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fidric et al. (5,313,480) in view of Falquier et al. (6,429,965).

With respect to claim 24, Fidric teaches that the temperature of the fiber can be control using a peltier or a thermo-electric cooler (col. 4, lines 36-41) with the exception of a specific range. However, the temperature of the fiber can be control to approximately +-0.5 degree Celsius is well known in the art as taught by Falquier (col. 14, lines 3-4). Based on those two references, It would have been obvious to one of ordinary skill in the art at the time the invention was made to control the temperature of the EDF to be stable within a range to provide a predetermined stability of the SFS mean wavelength.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tod T. Van Roy whose telephone number is (571)272-8447. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Minsun Harvey can be reached on (571)272-1835. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

TVR

MINSUN OH HARVEY
PRIMARY EXAMINER